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Factors Influencing Toddler Nutritional and Developmental Outcomes at the Bangkalan Health Center, Madura Island, Indonesia: A PRECEDE–PROCEED Model Approach

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ABSTRACT

Background: The nutritional and developmental status of toddlers in Indonesia remains a significant concern, requiring further analysis of influencing factors to enable more comprehensive interventions. **Objectives:** This study aimed to analyze the factors that influence the nutritional and developmental status of toddlers using the PRECEDE–PROCEED Model. **Methods:** This is a cross-sectional study that involved 472 mothers who had children aged 12-60 months, selected by cluster sampling through 88 Integrated Service Posts in the Bangkalan Health Center area. The dependent variables in this study were the nutritional status and developmental status of toddlers aged 12-60 months. While the independent variables in this study were predisposing factors, enabling factor, and reinforcing factor. Data collection was conducted using questionnaires, the child development pre-screening questionnaire, and the 'Maternal and Child Health' handbook. Logistic regression analysis was performed with a significance level of 0.05. **Results:** The results showed that the factors influencing toddlers' nutritional status included predisposing factors such as maternal knowledge, maternal education level, and maternal participation in monthly Integrated Service post activities. Reinforcing factors such as husband's support, families, healthcare, and exposure to health information also affect toddler nutrition. In terms of toddler development, there are reinforcing factors in the form of husband and family support for mothers in providing developmental stimulation to their toddlers. **Conclusion:** The critical role of husband and family support in shaping the nutritional and developmental status of toddlers aged 12-60 months. Therefore, educational interventions should target not only mothers but also their families to optimize child health and development.

Keywords: Nutritional Status; Precede-Proceed Model; Stunting; Toddler Development

INTRODUCTION

The issue of malnutrition among children under five years old, particularly in Indonesia, has reached critical levels, manifesting in various forms such as stunting, wasting, and the dual burden of malnutrition. The Joint Child Malnutrition Estimates (JME) report of 2023 indicates that globally, approximately 148 million children under five are stunted, 45 million are wasted, and 37 million are overweight, highlighting a significant public health crisis (UNICEF, 2023; Ramphal *et al.*, 2020). In Indonesia, the situation is particularly alarming, with stunting rates reported at 17.1% in 2023, exceeding the national target of 14% for 2024 (Johnson *et al*., 2021). This indicates a pressing need for effective interventions to address these nutritional challenges.

Stunting, characterized by low height-for-age, is a direct consequence of chronic malnutrition and has long-term implications for physical and cognitive development (Joshi *et al*., 2020). The prevalence of stunting in East Java Province is reported at 19.2%, with Bangkalan Regency showing even higher rates at 26.2% (Mihrshahi *et al*., 2022). These figures underscore the urgent need for targeted nutritional programs and interventions aimed at

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improving the dietary intake and overall health of children in these regions. The Indonesian government has initiated several strategies, including anemia screening and nutritional education for mothers, which are essential for addressing the root causes of malnutrition (Hossain *et al*., 2024). Wasting, defined as low weight-for-height, is another critical issue affecting Indonesian toddlers, with a recorded prevalence of 7.7% in 2022 (Krombholz, 2023). This condition is often exacerbated by acute food shortages and health crises, leading to severe health outcomes if not addressed promptly. The Indonesian Nutritional Status Survey highlights the need for comprehensive strategies that not only focus on immediate nutritional needs but also consider underlying factors such as food security and maternal health (Matsubara *et al*., 2022). The interplay between maternal nutrition and child health is well-documented, with studies indicating that maternal dietary patterns significantly influence the nutritional status of their children (Alvarado-Domenech *et al.*, 2022). The dual burden of malnutrition, where undernutrition coexists with overweight and obesity, presents a complex challenge for public health in Indonesia. The overweight prevalence among toddlers is reported at 3.5%, which, while lower than the global average, still poses risks for future health complications (Addae *et al*., 2024). This phenomenon is often linked to changing dietary patterns and lifestyle factors, necessitating a multifaceted approach to nutrition education and community engagement (Wei *et al*., 2022). The role of parents, particularly mothers, in shaping dietary habits and nutritional practices cannot be overstated, as their knowledge and attitudes directly impact their children's health outcomes (Deoni *et al.*, 2022).

The developmental implications of malnutrition are profound, with studies indicating that nutritional deficiencies during critical growth periods can lead to long-term cognitive and physical impairments (Ballarotto *et al*., 2023). The World Health Organization (WHO) has reported that developmental disorders affect approximately 28.7% of children in Indonesia, highlighting the need for early interventions that address both nutrition and developmental support (Rivera *et al.*, 2024). Effective strategies must include regular developmental screenings and parental education to ensure that children meet their developmental milestones (Au *et al*., 2023). Research has shown that maternal health and nutrition during pregnancy and lactation are crucial for optimal child development. For instance, maternal vitamin D levels during pregnancy have been positively associated with cognitive outcomes in children (Nasution *et al*., 2023). Additionally, iron deficiency during infancy has been linked to behavioral issues later in life, emphasizing the importance of addressing nutritional needs from conception through early childhood (Schneider *et al*., 2023). The integration of nutrition education into maternal and child health programs is essential for fostering healthier future generations (Cantoral *et al.*, 2021).

In addressing the nutritional challenges faced by Indonesian toddlers, it is vital to consider the broader socio-economic context. Factors such as poverty, education, and access to healthcare significantly influence nutritional outcomes (Hasken *et al.*, 2022). Community-based interventions that empower families and improve food security can play a pivotal role in reducing malnutrition rates (Kang *et al*., 2021). Programs that provide nutritional supplements and education, particularly in high-prevalence areas like Bangkalan, are critical for achieving national health targets (Landry *et al.*, 2022). Furthermore, the role of local culture and practices in shaping dietary habits must be acknowledged. Cultural beliefs and practices can significantly influence food choices and feeding practices among families (Johnson *et al.*, 2024). Understanding these cultural dynamics is essential for designing effective interventions that resonate with local communities and promote healthier eating behaviors (Mak *et al*., 2023). Engaging community leaders and utilizing culturally relevant messaging can enhance the effectiveness of nutrition programs (Maidoumi *et al.*, 2022).

To develop and implement effective health promotion strategies, this study utilizes the PRECEDE-PROCEED model, a comprehensive framework for planning and evaluating public health interventions. The PRECEDE (Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation) phase focuses on identifying and analyzing the factors that influence health behaviors, such as knowledge, attitudes, and community resources. The PROCEED (Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development) phase emphasizes the implementation and evaluation of strategies based on these findings. This model is particularly useful in identifying not only individual-level determinants such as maternal knowledge and practices but also broader contextual influences like family support, healthcare access, and socio-economic status. Applying the PRECEDE-PROCEED model in the

context of Bangkalan allows for a structured and participatory approach to understanding the root causes of poor nutritional and developmental outcomes, thereby guiding the design of culturally sensitive and sustainable interventions. This study is significant as it provides insight into the key factors influencing malnutrition and child development in Indonesia, particularly the role of maternal knowledge, family support, and socio-economic conditions. By identifying these determinants, the findings can inform policymakers, healthcare providers, and community leaders in designing more effective interventions. In conclusion, the malnutrition crisis among toddlers in Indonesia requires a comprehensive and coordinated response that addresses the multifaceted nature of the issue. By focusing on maternal education, community engagement, and targeted nutritional interventions, Indonesia can make significant strides toward improving the health and well-being of its youngest citizens. The urgency of this situation cannot be overstated, as the long-term consequences of malnutrition extend beyond individual health, impacting societal development and economic growth (Dewey *et al*., 2021).

In addition to public health and behavioral determinants, the nutritional and developmental status of toddlers is closely related to core nursing responsibilities. Community health nurses play a pivotal role in conducting growth monitoring, providing developmental stimulation guidance, offering family-centered counseling, and implementing early detection of nutritional problems through routine Posyandu activities. The nursing process – covering assessment, diagnosis, planning, implementation, and evaluation – is essential for identifying at-risk children and developing appropriate care plans in collaboration with families. Incorporating a nursing perspective within the PRECEDE–PROCEED framework strengthens the understanding of how nursing interventions, family empowerment, and community engagement contribute to improving toddler nutrition and development (Posmontier *et al*., 2024).. This study therefore provides important evidence to support community-based nursing practice and family-centered care models in Indonesian primary healthcare settings.

METHODOLOGY

Study Design and Participation

This study was an observational-analytical study with a cross-sectional approach. The sampling technique used was cluster sampling (Carlin & Hocking, 1999). The Bangkalan Health Center has 88 active integrated service posts, so 10 research subjects will be taken in each integrated service post spread across the Bangkalan Health Center area. The data collection was carried out from April to June 2024. The inclusion criteria in this study were mothers who had children aged 12-60 months, had reading and writing ability, and had a willingness to join this study. The exclusion criteria were mothers who had toddlers with a history of chronic diseases. Of the 637 mothers assessed for eligibility, 165 were excluded (63 because they refused to participate and 102 for not meeting the inclusion criteria), and the mothers enrolled in this study were 472 respondents.

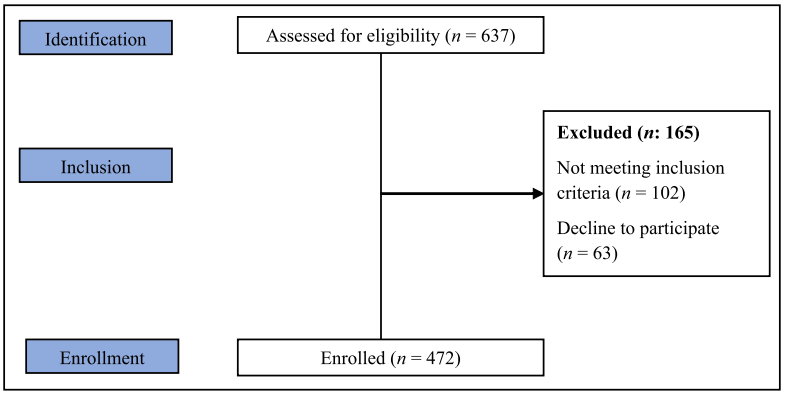

Figure 1: Flow Chart of the Participants

Data Variables

The dependent variables in this study were the nutritional status and developmental status of toddlers aged

12-60 months. The independent variables in this study were mother's knowledge, mother's education level, mother's occupation, family economic level, and mother's activity in the integrated service post (predisposing factor); integrated service post facility and infrastructure (enabling factor); husband's support, family support, cadre support, and exposure to information (reinforcing factor).

Data Collection

The data were collected with the assistance of the village midwives and community health nurses by visiting integrated service posts. In alignment with nursing standards of practice, these nurses conducted preliminary assessments of child nutritional status and developmental achievements using nationally standardized tools such as the Maternal and Child Health Handbook and the Pre-Screening Developmental Questionnaire (Kuesioner Pra Skrining Perkembangan = KPSP). This integration of nursing assessment practices ensures that data reflect not only anthropometric indicators, but also functional developmental observations routinely conducted in community nursing care. The selected mothers were then explained about the study, and if they agreed to become the respondent, a piece of informed consent was signed before the interview, and data collection was conducted for the study purpose (Constantino *et al*., 2020).

The data were collected through interviews and questionnaires with mothers about respondent characteristics, mother's knowledge, mother's education level, mother's occupation, family economic level, mother's activeness in integrated health posts, integrated service post facility and infrastructure, husband's support, family support, cadre support, and exposure to information. Meanwhile, the data about the nutritional status and developmental status of toddlers were taken by looking at the book "Maternal and Child Health" and the Pre-Screening Questionnaire for Development.

Data Analysis

The data were analyzed using the IBM SPSS Statistics 22 application with a 95% confidence level. The data about the respondent's characteristics were explained using frequency distribution. The data about mother's knowledge, mother's education level, mother's occupation, family economic level, mother's activeness in integrated service posts, integrated service post facility and infrastructure, husband's support, family support, cadre support, and exposure to information towards the effect on nutritional status and developmental status of toddlers were analyzed using logistic regression (Zeru *et al*., 2023).

Ethical Consideration

The research obtained ethical clearance from the Health Research Ethics Committee, STIKES Ngudia Husada Madura College of Health Sciences, Indonesia with reference number 2251/KEPK/STIKES-NHM/EC/VIII/2024 on 20th August, 2024.

RESULTS

Table 1 shows that most mothers of toddlers are of productive age, namely 21-35 years old, as many as 362 people (76.7%). Most mothers of toddlers have 2 children, as many as 343 people (72.7%), most of whom are aged 12-24 months (70.1%). Table 1 also shows that most mothers have good knowledge about the status of child growth and development (82.0%), most mothers have a relatively low level of education (high school), as many as 306 people (64.8%). Meanwhile, when viewed from the family economic status, most of them are classified as underprivileged with incomes less than the minimum wage of Bangkalan City (57.2%). Most mothers of toddlers are active in participating in integrated service posts (58.5%), and almost all integrated health posts in the research area have adequate facilities (98.8%). When viewed from the factors that strengthen the occurrence of behavior, most mothers of toddlers have strong husband support (67.8%), but family support and cadre support are mostly still weak (50.6% and 50.2%). Most mothers of toddlers have received information exposure from health workers and cadres (82.6%). Most mothers of toddlers have children with good nutritional status (93.4%) and appropriate development (78.4%).

Table 1: General Research Data and Univariate Analysis of Research Variables Including Predisposing, Enabling, and Reinforcing Factors Affecting the Nutritional Status

Category		*N*	Percentage (%)
1	**Mother's Age**		
	≤ 20 years old	0	0.0
	years old	362	76.7
	>35 years old	110	23.3
2	**Number of Children**		
	≤ 2 children	343	72.7
	>2 children	129	27.3
3	**Toddler Age**		
	12 - 24 months old	331	70.1
	25 - 60 months old	141	29.8
4	**Mother's Knowledge**		
	Less	86	18.0
	Good	386	82.0
5	**Mother's Education**		
	Low	306	64.8
	High	166	35.2
6	**Mother's Occupation**		
	Housewife	270	57.2
	Labor	202	42.8
7	**Economic Level**		
	Low	277	58.7
	High	195	41.3
8	**Activeness of Integrated Service Post**		
	Inactive	196	41.5
	Active	276	58.5
9	**Facility and Infrastructure of Integrated Service Post**		
	Incomplete	1	0.2
	Complete	471	99.8
10	**Husband Support**		
	Low	152	32.2
	Strong	320	67.8
11	**Family Support**		
	Low	239	50.6
	Strong	233	49.4
12	**Cadre Support**		
	Low	237	50.2
	Strong	235	49.8
13	**Exposure to Information**		
	Rarely Exposed	82	17.4
	Frequently Exposed	390	82.6
14	**Nutritional Status**		
	Less	31	6.6
	Good	441	93.4
15	**Developmental Status**		
	Not Appropriate	102	21.6
	Appropriate	370	78.4

The researchers then linked and analyzed the predisposing, enabling, and reinforcing factors mentioned above with the nutritional status and developmental status of toddlers. The results of which can be described in the table below.

Based on Table 2 above, it can be concluded that the factors that influence the nutritional status of toddlers aged 12-60 months are mother's knowledge level, mother's education level, the mother's activeness in attending the integrated service post every month, husband's support, family support, cadre support, and exposure to information about toddler nutrition. All of these factors are statistically significant. Meanwhile, factors such as mother's occupation, family economic level, and integrated service post facility and infrastructure do not have a statistical effect on the nutritional status of toddlers.

Table 2: Logistic Regression Test Analysis of Predisposing, Enabling, and Reinforcing Factors Affecting the Nutritional Status

Variable	Category	Nutritional Status		OR	CI 95%		*P*
		Less	Good		Lower Limit	Upper Limit	
Mother's Knowledge	Less	14	72	68.77	2.77	171	0.010
	Good	18	369				
Mother's Education	Low	26	280	4.32	1.36	13.86	0.013
	High	5	161				
Mother's Occupation	Housewife	17	253	0.79	0.32	1.92	0.608
	Labor	14	188				
Economic Level	Low	17	260	0.42	0.18	1.17	0.066
	High	14	181				
Activeness of Integrated Service Post	Inactive	10	186	0.36	0.14	0.91	0.031
	Active	21	255				
Facility and Infrastructure of Integrated Service Post	Incomplete	0	1	0.00	0.00	0.00	1.000
	Complete	31	440				
Husband Support	Low	2	150	0.09	0.01	0.38	0.001
	Strong	29	291				
Family Support	Low	26	213	5.82	2.01	16.89	0.001
	Strong	5	228				
Cadre Support	Low	21	216	2.92	1.12	7.55	0.028
	Strong	10	225				
Exposure to Information	Rarely Exposed	12	70	0.04	0.04	0.97	0.048
	Frequently Exposed	19	371				

Based on Table 3 above, it can be concluded that the factors that influence the developmental status of toddlers aged 12-60 months are the support of husbands and families to mothers in stimulating the development of their babies or toddlers. Other factors such as mother's knowledge level, the mother's education level, mother's occupation, family's economic level, mother's activeness in attending the integrated service post every month, facility and infrastructure of the integrated service post, cadre support, and exposure to information do not have a statistical effect on the nutritional status of toddlers.

Table 3: Logistic Regression Test Analysis of Predisposing, Enabling, and Reinforcing Factors Affecting the Developmental Status of Toddlers

Variable	Category	Nutritional Status		OR	CI 95%		*p*
		Less	Good		Lower Limit	Upper Limit	
Mother's Knowledge	Less	42	44	0.00	0.00	0.00	0.999
	Good	60	326				
Mother's Education	Low	71	235	0.96	0.51	1.82	0.913
	High	31	135				
Mother's Occupation	Housewife	60	210	1.15	0.63	2.09	0.660
	Labor	42	160				
Economic Level	Low	61	216	0.99	0.53	1.86	0.984
	High	41	154				
Activeness of Integrated Service Post	Inactive	47	149	1.17	1.18	0.70	0.540
	Active	55	221				
Facility and Infrastructure of Integrated Service Post	Incomplete	0	1	4.21	4.22	0.00	1.000
	Complete	102	369				
Husband Support	Low	22	130	0.26	0.26	0.14	0.000
	Strong	80	240				
Family Support	Low	80	159	6.08	6.08	3.41	0.000
	Strong	22	211				
Cadre Support	Low	59	178	1.11	0.66	1.87	0.703
	Strong	43	192				
Exposure to Information	Rarely Exposed	42	40	2.99	0.00	0.00	0.999
	Frequently Exposed	60	330				

Based on Table 3 above, it can be concluded that the factors that influence the developmental status of toddlers aged 12-60 months are the support of husbands and families to mothers in stimulating the development of their babies or toddlers. Other factors such as mother's knowledge level, the mother's education level, mother's occupation, family's economic level, mother's activeness in attending the integrated

service post every month, facility and infrastructure of the integrated service post, cadre support, and exposure to information do not have a statistical effect on the nutritional status of toddlers.

DISCUSSION

Analysis of Factors Affecting the Nutritional Status of Toddlers Aged 12-60 Months

The nutritional status of toddlers is significantly influenced by various factors, particularly maternal knowledge of nutrition, education level, and family support. Research indicates that mothers with low nutritional knowledge are substantially more likely to have toddlers with poor nutritional status, with an odds ratio of 68.77 and a *p*-value of 0.010, underscoring the critical role that maternal nutritional knowledge plays in decision-making regarding children's dietary needs (Krombhol, 2023). This finding aligns with previous studies that have shown that enhancing maternal nutritional knowledge can lead to improved nutritional outcomes for children, suggesting that structured nutritional health education should be prioritized in maternal and child health programs (Ramphal *et al*., 2020; Mihrshahi *et al*., 2022).

Moreover, maternal education has been identified as a significant determinant of toddler nutritional status, with an odds ratio of 4.32 and a *p*-value of 0.013 for mothers with lower education levels (Johnson *et al*., 2021). This correlation suggests that formal education enhances mothers' understanding of health information, including nutrition, thereby impacting their ability to provide adequate dietary care for their children. Empowering women through education is essential, as it not only increases awareness about health and nutrition but also fosters long-term improvements in children's nutritional status (Hossain *et al*., 2024; Joshi *et al*., 2020).

Family dynamics, particularly the support from husbands and other family members, also play a crucial role in the nutritional status of toddlers. Strong support from husbands can decrease the risk of malnutrition significantly (OR = 0.09; $p = 0.001$), while weak family support can increase the risk by up to 5.82 times ($p = 0.001$) (Alvarado-Domenech *et al*., 2022; Deoni *et al*., 2022). This highlights the importance of emotional, material, and logistical support from family members in enabling mothers to meet their children's nutritional needs effectively. Consequently, intervention programs should involve all family members, particularly husbands, to foster an environment conducive to fulfilling children's nutritional requirements (Wei *et al*., 2022).

Additionally, mothers' active participation in integrated service posts has been linked to better nutritional outcomes for toddlers (OR = 0.36; $p = 0.031$) (Matsubara *et al*., 2022). These service posts are vital for monitoring nutritional status, providing counseling, and distributing supplements. The proactive engagement of health cadres in motivating mothers to attend these posts is essential for enhancing access to nutritional information and support (Addae *et al*., 2024). Thus, active participation not only aids monitoring but also elevates mothers' knowledge regarding the importance of nutrition for their children.

Furthermore, exposure to nutritional information significantly influences toddlers' nutritional status (OR = 0.04; $p = 0.048$), emphasizing the need for effective communication strategies to disseminate nutritional knowledge (Mills-Koonce *et al.*, 2022). Interventions utilizing social media, community outreach, and health campaigns can enhance maternal knowledge, leading to improved nutritional outcomes for children. Therefore, implementing robust communication strategies is crucial to ensure that mothers can make informed decisions about their children's nutrition (Hasken *et al.,* 2022).

While factors such as maternal occupation and family economic status were not statistically significant in determining toddlers' nutritional status, it is evident that the knowledge and behavior of the primary caregiver are paramount in childcare decisions (Pancheva *et al*., 2024). Thus, interventions should focus not only on providing physical resources but also on strengthening the social, educational, and psychological aspects of maternal care, which are vital for improving toddlers' nutritional status (Kang *et al.*, 2021). A holistic approach that encompasses that encompasses maternal empowerment, family education, and community strengthening is essential for enhancing the nutritional status of toddlers. By integrating various stakeholders, including husbands, families, and health cadres, efforts to increase nutritional knowledge and awareness can be more effective and sustainable. Structured nutrition education should be prioritized in maternal and child health interventions to ensure that mothers are equipped to meet their children's nutritional needs adequately (Coyle-

Asbil *et al*., 2024). This comprehensive strategy is expected to significantly reduce the prevalence of malnutrition among toddlers and improve overall public health outcomes.

Analysis of Factors Affecting the Developmental Status of Toddlers

The involvement of husbands in childcare has emerged as a critical factor influencing toddler development. Research indicates that husband support is positively correlated with developmental outcomes in toddlers, evidenced by an odds ratio (OR) of 0.26 and a *p*-value of less than 0.001, suggesting a statistically significant relationship. This support encompasses not only direct assistance to mothers but also the creation of a nurturing environment conducive to child development. Activities such as playing together and backing maternal parenting decisions are essential components of this supportive role, effectively enhancing the quality of stimulation that children receive during their formative years (Matsubara *et al*., 2022). Moreover, the significance of overall family support cannot be overstated. Studies have shown that families providing robust support systems exhibit a strong correlation with toddler development, reflected in an OR of 6.08 and a *p*-value of less than 0.001. Such family dynamics foster an atmosphere that is beneficial for cognitive, emotional, and social growth in children. This support may manifest in various forms, including direct engagement with children, financial assistance, and the provision of relevant information to mothers. Consequently, intervention programs that actively involve all family members, particularly husbands, can significantly enhance the quality of developmental stimulation for toddlers, especially in communities where external support is limited (Mihrshahi *et al*., 2022).

Interestingly, while maternal education and knowledge are often highlighted as pivotal factors in child development, recent data suggest that these elements do not consistently yield statistically significant impacts on toddler developmental status. This discrepancy may arise from the challenges mothers face in applying their knowledge effectively without adequate support from husbands or other family members. The findings underscore the notion that social and emotional support from husbands and family members may exert a more substantial influence on child development than maternal knowledge alone. This revelation calls for a reevaluation of the emphasis placed on maternal education in isolation, advocating instead for a more integrated approach that recognizes the importance of family dynamics in child-rearing practices (Ramphal *et al.*, 2020).

The role of integrated service posts and community health cadres in supporting toddler development is another area of concern. Although these service posts are designed to monitor child development, analyses reveal that their activities do not always correlate significantly with toddler developmental outcomes. Factors such as the quality of services rendered, the frequency of visits, and the level of maternal participation in these programs may contribute to this lack of correlation. Therefore, enhancing the capacity of integrated service posts and health cadres to deliver practical, accessible education to families is imperative for bolstering child development initiatives (Johnson *et al*., 2021). Furthermore, the economic status of families and maternal employment do not appear to significantly influence toddler development outcomes. This finding suggests that emotional and social support may play a more critical role in fostering optimal developmental environments than material resources alone. For instance, career-oriented mothers can still provide quality stimulation to their children if they receive adequate support from their husbands and family members. This reinforces the notion that family support, particularly from husbands, is a fundamental element in creating an environment conducive to child development (Alvarado-Domenech *et al.*, 2022).

The implications of the study's findings underscore the critical importance of adopting integrated, family-centered approaches to simultaneously improve both toddler developmental and nutritional outcomes. Development and nutrition are deeply interconnected; inadequate nutrition during the early years not only stunts physical growth but also impairs cognitive and socio-emotional development. Additionally, further research is warranted to explore the interactions between various factors that did not show significant relationships in this analysis, particularly the role of integrated service posts in ensuring effective child health services (Hossain *et al.*, 2024). A holistic approach that incorporates family support and community engagement is essential for improving the quality of toddler development sustainably. The involvement of husbands and strong family support systems can create a nurturing environment that promotes optimal growth and development for children. For stakeholders, especially health policymakers, the results highlight the need

to move beyond mother-centric interventions and embrace broader family-based strategies. The active involvement of husbands and other family members, such as grandparents and older siblings, in caregiving and feeding routines can significantly improve health outcomes for children. Policies that integrate family education modules within maternal and child health services, such as those offered through Posyandu (integrated service posts), can enhance the uptake and effectiveness of health messages. Encouraging male participation in parenting classes, nutrition counseling, and community health activities can reduce maternal burden, mitigate stress, and foster a more supportive home environment, which is crucial for sustaining child health improvements (Krombholz, 2023).

Moreover, husband support extends beyond the immediate realm of childcare; it also plays a crucial role in alleviating maternal stress, which can positively affect mothers' mental and physical health. Research indicates that emotional support from husbands enhances mothers' confidence in their parenting roles, ultimately improving the quality of interactions between mothers and their children (Wei *et al*., 2022). Importantly, the findings also signal a need for stakeholders to invest in the revitalization and capacity-building of community-based health services like Posyandu. These grassroots platforms are ideally positioned to deliver holistic services, but often face constraints related to personnel, infrastructure, and training. Strengthening their role in monitoring child growth, conducting early developmental screenings, and delivering culturally sensitive education to families will be instrumental in ensuring sustainable improvements in both nutritional and developmental outcomes. Additionally, further research should explore the barriers to effective utilization of Posyandu and similar services, particularly in underserved regions like Bangkalan.

From a nursing perspective, the findings highlight the importance of comprehensive family-centered care in improving toddler nutritional and developmental outcomes. Community health nurses, as front-line providers in Posyandu, play an essential role in educating mothers, facilitating health promotion activities, and empowering families to adopt appropriate feeding and stimulation practices. The significant influence of husband and family support aligns with nursing theories emphasizing the family as a unit of care. Nurses must therefore implement strategies such as family counseling, anticipatory guidance, and participatory education to enhance supportive behaviors within households. Furthermore, reinforcing factors identified in this study underscore the need for strengthened nursing interventions focusing on communication, health literacy, and community mobilization to ensure that families receive continuous, structured guidance in child health.

Educational initiatives aimed at informing husbands about their roles in childcare and its implications for child development are vital. Programs that engage husbands in health education and parenting practices can significantly enhance their awareness of the support they provide. This involvement not only benefits mothers but also contributes positively to the overall developmental trajectory of children (Deoni *et al*., 2022). Furthermore, husbands' participation in reproductive health aspects, such as encouraging antenatal check-ups, is integral to maternal and child health. Studies show that husbands who actively engage in the pregnancy process tend to motivate mothers to prioritize their health and maintain regular medical appointments. This highlights that husband support is crucial not only in parenting but also in broader health contexts, reinforcing the multifaceted nature of their involvement (Joshi *et al*., 2020).

The evidence underscores the critical role of husband support in toddler development across various dimensions, including parenting, health, and maternal well-being. This support encompasses a wide range of activities, from direct engagement in childcare to promoting health-seeking behaviors during pregnancy. Therefore, it is imperative to design intervention programs that actively involve husbands and all family members in supporting child development. By adopting a holistic, family-centered approach, we can significantly enhance the quality of toddler development and foster environments that facilitate optimal growth and learning (Hasken *et al.*, 2022).

Limitations

This study did not explore specific nursing interventions or the quality of nursing care provided at Posyandu, which may influence both nutritional and developmental outcomes. Environmental and socio-cultural factors unique to the Bangkalan area were also not measured in depth, limiting generalizability to other regions. Future studies should consider longitudinal designs, incorporate direct observation of nursing care

practices, include fathers and extended family members as respondents, and integrate qualitative approaches to better understand the contextual factors influencing toddler nutrition and development.

CONCLUSION

Predisposing factors that affect toddler nutritional status are the mother's knowledge level, mother's education level, and the mother's activeness in attending the integrated service post every month. Meanwhile, reinforcing factors that affect toddler nutritional status are husband's support, family support, cadre support, and exposure to information. Factors that affect toddler development are reinforcing factors in the form of husband and family support for mothers in providing developmental stimulation to their toddlers.

Future research could explore interventions to enhance husband and family support in improving toddler nutrition and development. Additionally, further study could examine the impact of digital health education and also investigate the role of socio-economic status and cultural factors in shaping family support into optimizing intervention for better child health outcomes.

Conflict of Interest

The authors declare that they have no competing interests.

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